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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,470	09/19/2003	Chandramouli Visweswariah	YOR920030402US1	9381

7590 02/17/2006

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EXAMINER

LIN, SUN J

ART UNIT	PAPER NUMBER
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2825

DATE MAILED: 02/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/666,470	Applicant(s) VISWESWARIAH, CHANDRAMOULI	
	Examiner Sun J. Lin	Art Unit 2825	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 January 2006.
 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-62 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) ☒ Claim(s) 2-8, 16, 18-20 and 29-62 is/are allowed.
 6) ☒ Claim(s) 1, 9, 12-15, 17 and 21-28 is/are rejected.
 7) ☒ Claim(s) 10, 11 and 28 is/are objected to.
 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
 10) ☒ The drawing(s) filed on 09/19/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to applicants' Amendments and Remarks filed on 01/24/2006 regarding application 10/666,470 filed on 09/19/2003. Claims 1 – 62 remain pending in the application.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 1, 9, 12 – 15, 17 and 21 – 27 are rejected under 35 U.S.C. 102(a) as being unpatentable over IEEE paper entitled "*Timing Minimization by Statistical Timing hMetis-based Partitioning*" authored by Ababei et al.

4. As to Claim 1, Ababei et al. show and disclose the following subject matter:

- A simulation setup (i.e., system) for determining (timing) criticality information in an integrated circuit – [Fig. 4;abstract];
- A netlist input for receiving a gate netlist, which is a circuit schematic for a combinational circuit – [Fig. 4; Fig. 2(b); Section 3];
- Compute delays of wires sing Elmore delay module – [Section 4]; Notice that the delays of wires are calculated based on boundary timing conditions associated the wires under study;
- Sources of delay variation are captured using statistical timing analysis by considering gate and wire delays as stochastic variables (i.e., probability distribution functions **pdf**) – [Section 3]; Notice that a list of sources of delay variation is received for use in computing all criticalities in the circuit understudy – [Section 4];
- (Parameterized) delay model utilizing **pdf** associated with each component (e.g., gate, wire) in the circuit under study – [Section 5];

- Criticality Computation is a process that determines and outputs timing criticality information of the circuit under study – [Fig. 4].

For reference purposes, the explanations given above in response to Claim 1 are called **[Response A]** hereinafter.

5. As to Claim 9, Ababei et al. show in Fig. 2 (a) and disclosed (1) critical path concept (2) a path with largest criticality in a circuit is the most critical in terms of timing – [Section 3]. Notice that a most critical path is one has the highest probability of being critical.

6. As to Claim 12, Ababei et al. show and disclosed the subject matter in [Fig. 2].

7. As to Claim 13, Ababei et al. show and disclosed the subject matter in [Fig. 1; Fig. 2; Section 3].

8. As to Claim 14 and 15, a higher criticality value indicates a late mode criticality information; whereas a low criticality value indicates an early-mode criticality information.

9. As to Claim 17, Ababei et al. show in Fig. 2 and disclosed that the electrical circuit is a combinational circuit.

10. As to Claim 21, as included in **[Response A]** given above, Ababei et al. disclosed the parameterized delay model uses stochastic variables, which is an independent random variable.

11. As to Claims 22 and 23, the sources of variation are correlated or independent dependent upon the location (in the circuit) at which a component is considered – [Fig. 1].

12. As to Claims 24 – 26, the parameterized delay models can be (1) pre-stored in a table (2) pre-stored as coefficients of delay equations or (3) determined by circuit

simulation on-the-fly dependent upon steps to be applied in the simulation set-up for use in Criticality Computation – [Fig. 4].

13. As to Claim 27, each of the one or more assertions can be deterministic or statistical dependent upon location of a component (of the circuit), which it is associated with.

Allowable Subject Matter

14. Claims 2 – 8, 16, 18 – 20, 29 – 62 are allowed. Claim 10, 11 and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 29 – 62 are allowed due to allowable subject matter as recited in Office Action mailed on 10/24/2005.

Claims 2, 16 and 18 – 20 are allowed because Claims 2, 16, 18 and 20, which were allowed due to allowable subject matter recited in the aforementioned Office Action, are respectively rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 3 – 8, 10, 11 and 28 are allowed because that the prior art does not teach or fairly suggest the following subject matter:

- A system for determining timing criticality information of an electrical circuit wherein the timing criticality information is a component criticality probability of each of the one or more components of the electrical circuit in combination with other limitations as recited in independent **Claim 3**;
- A system for determining timing criticality information of an electrical circuit wherein the timing criticality information is a path criticality probability of each of the one or more paths of the electrical circuit in combination with other limitations as recited in independent **Claim 4**;
- A system for determining timing criticality information of an electrical circuit wherein the timing criticality information is used to determine a user-provided number of a critical paths in order of criticality probability in combination with

other limitations as recited in independent **Claim 10**;

- A system for determining timing criticality information of an electrical circuit wherein the timing criticality information is used to determine one or more critical paths in order of criticality probability until the sum of the criticality probabilities exceeds a user-provided probability threshold in combination with other limitations as recited in independent **Claim 11**;
- A system for determining timing criticality information of an electrical circuit wherein a clock-edge information is one of deterministic and statistical in combination with other limitations as recited in independent **Claim 28**.

Response to Amendment and Remarks

15. Applicant's amendments and remarks filed on 01/24/2006 have been reviewed. Applicant's arguments have been fully considered but they are not persuasive. Key argument and its response related to the claims are listed as below:

[Argument]: Prior art (IEEE paper authored by Ababei et al.) does not disclose or suggest a method that includes a step that includes a model for delay variation of each component of the electrical circuit.

[Response]: Prior art (Ababei et al.) discloses "These uncertainties are modeled in statistical timing analysis (e.g., a stochastic model) by considering gate and wire delays as stochastic variables (i.e., probability distribution functions). That means that the delay variation is captured by standard deviation." –

[Section 3 Statistical Timing Analysis]. Notice that (1) each of a gate and a wire is a component of a electrical circuit under study (2) statistical timing analysis using a stochastic model, which is a parameterized delay model (3) gate and wire delays as stochastic variables, which are delay parameters for use in the stochastic model.

Conclusion

16. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to *Sun James Lin* whose telephone number is (571) 272 - 1899. The examiner can normally be reached on Monday-Friday (9:00AM-6:00PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, *Jack Chiang* can be reached on (571) 272 - 7483. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308 - 7382 for regular communications and (703) 305 - 3413 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 - 1782.

Sun James Lin
Patent Examiner
Art Unit 2825
February 15, 2006

